

A NEW MUTANT OF *DANAUS PLEXIPPUS* SSP.  
*ERIPPUS* (CRAMER)

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**ABSTRACT.** A mutant form of *Danaus plexippus* f. *erippus*, controlled by an autosomal recessive gene, is described from Argentina. It appears to differ from the "al-bino" form occurring in Hawaii.

In 1978 Mr. Robert Goodden kindly sent us eggs and larvae of *Danaus plexippus* ssp. *erippus* (Figs. 1-9) derived from Buenos Aires, Argentina. The larvae were easily reared on species of *Asclepias* and the insects (the "main stock") were released in heated greenhouses both on Merseyside and at Ashton in Northamptonshire. In the next generation of insects there appeared in both sexes an unusual aberration, and as far as we know a description of this has not previously been published. In its most extreme form the cell on both the upper and undersides of the forewing is very pale yellowish-cream colored instead of orange. Pale yellow areas are also a feature in the subapical region and there is a thin line of this color along the costal margin of the forewings. In general the abnormality is much more marked in the female (Figs. 5, 6) than in the male (Figs. 7-9). None of the pale yellow areas fluoresced under ultraviolet light.

It seemed possible that this unusual pattern was controlled by an autosomal recessive mutant gene in double dose and our breeding results (Tables 1-3) support this view.

AUTOSOMAL INHERITANCE OF THE PATTERN

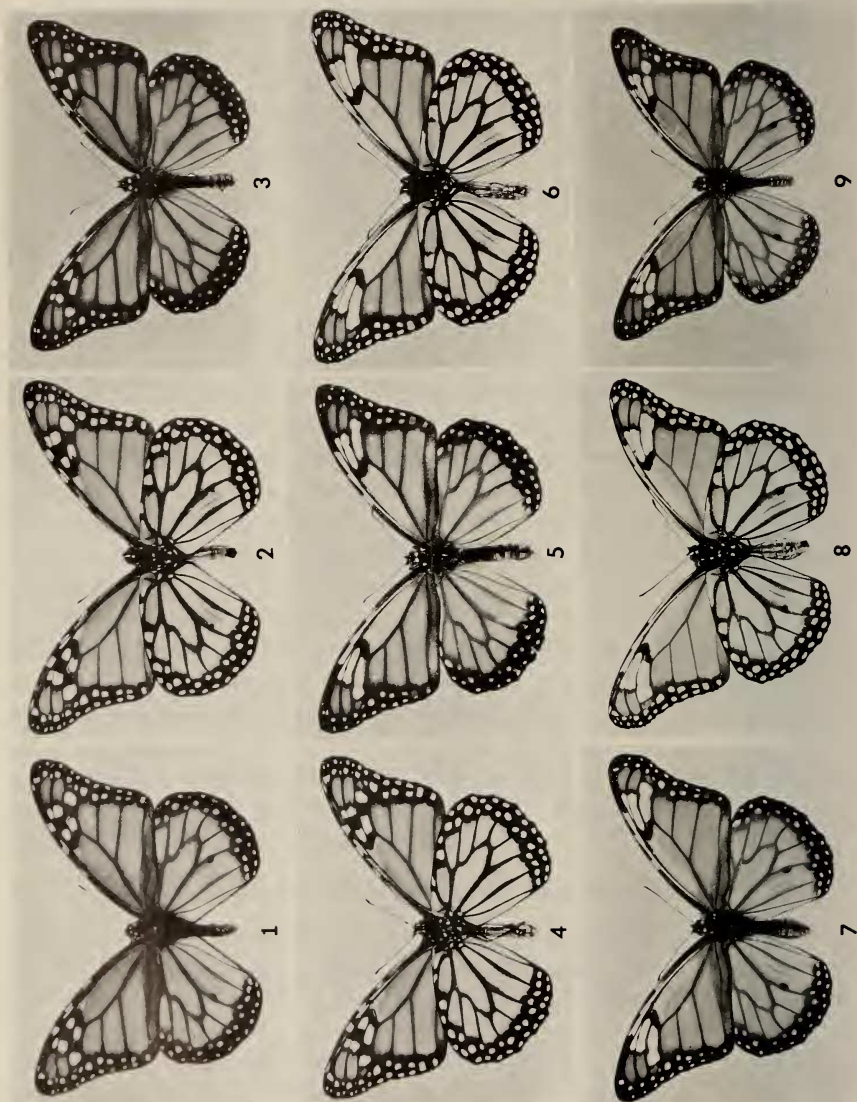
The locus controlling the mutant gene cannot be on the nonpairing part of the Y chromosome because mutant females have given rise to mutant males (see Table 1, brood 15619, and all three broods in Table 3).

X-linkage is contradicted by brood 15575 (see Tables 1 and 2) because mutants of both sexes appeared in the offspring of normal parents which must both have been heterozygotes. If the gene had been

TABLE 1. Parents and progeny of broods involving the mutant form of *Danaus plexippus erippus* from Argentina.

	Parents		$\delta$	Offspring				Remarks
				normal		mutant		
				$\delta\delta$	$\varphi\varphi$	$\delta\delta$	$\varphi\varphi$	
15440	"main stock" mutant	"main stock" normal	4	2	—	—	Consistent with recessive hypothesis	
15469	"main stock" mutant	"main stock" normal (same as 15470)	4	5	4	5	Consistent with backcross	
15470	"main stock" normal	"main stock" normal (same as 15469)	2	3	1	1	Consistent with mating of two heterozygotes and gives the expected ratio	
15473	"main stock" mutant	"main stock" (form unknown) <sup>1</sup>	2	1	3	1	Consistent with backcross	
15575	15440 normal	15440 normal	32	15	5	10	Consistent with mating of two heterozygotes and gives the expected ratio	
15598	15470 mutant	15470 (form unknown) <sup>1</sup>	4	4	2	3	Consistent with backcross	
15601	15470 normal	15470 normal	9	17	5	7	Consistent with mating of two heterozygotes	
15619	"main stock" mutant	"main stock" mutant	—	—	4	—	Consistent with recessive hypothesis	

<sup>1</sup> Mating not observed.



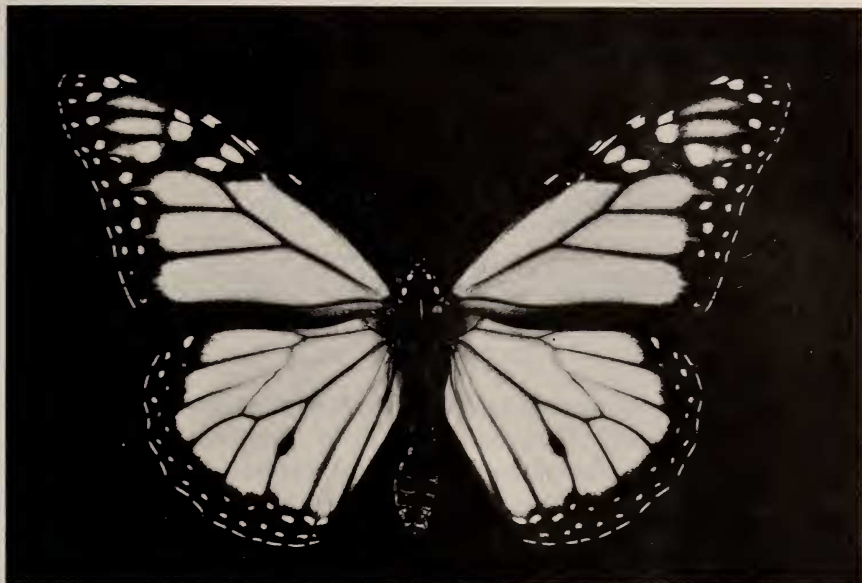


FIG. 10. Male "albino" Hawaiian monarch. Honolulu, ex larva 21 Dec. 1976, F. G. Howarth, collector. Photograph courtesy of the Dept. of Photography, B. P. Bishop Museum, Honolulu, Hawaii, L. Gilliland & J. C. E. Riotte.

X-linked the mother would have been of the mutant form. We can therefore safely say that the mutant gene is autosomal.

#### FERTILITY

We had no difficulty in breeding from the heterozygous stock but our impression is that the mutant butterflies are relatively inactive and that the mutant  $\times$  mutant mating is very infertile. Thus from two mutant males and three mutant females put together in a separate greenhouse we only obtained eggs from one female and many of these were infertile. Only four mutant males resulted (brood 15619, Table 1).

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FIGS. 1-9. Normal and mutant phenotypes of *Danaus plexippus* ssp. *erippus* from Argentina stock. 1-2, normal male; 3-4, normal female; 5-6, mutant female; 7-8, mutant male; 9, less extreme mutant male. First photo = dorsal view; second photo = ventral view of each specimen.

TABLE 2. Totals of matings between presumed heterozygotes.

Parents		Offspring			
		Normal		Mutant	
		♂♂	♀♀	♂♂	♀♀
15470	normal ♀ × normal ♂	2	3	1	1
15575	normal ♀ × normal ♂	33	15	5	10
15601	normal ♀ × normal ♂	9	17	5	7
		44	35	11	18

## COMMENT

Mutations arise by chance and are usually deleterious because they upset the adjustment of the organism to its environment. However, sometimes they may be advantageous and this needs particular consideration in the case of models and mimics. For example, if mimics of any given model become too common, the models escape by evolving new patterns (as is probably the case in *Danaus chrysippus*). This series of events is unlikely to occur in the case of *erippus* since it is not only a poor storer of cardenolides (though a good sequesterer of pyrrolizidine alkaloids, which are probably equally important for defense purposes (Rothschild & Marsh, 1978)) but its mimics are conspicuous by their absence. The only possible contender is *D. gilippus xanthippus*, but the flight periods of the two butterflies in Brazil barely overlap—except briefly in October and February. Since both species feed as larvae and adults on the same plants (Biezanko, 1960) they may possibly present a case of “tandem” mimicry (Rothschild, 1963). However in Hawaii, where *Danaus plexippus* is the only *Danaus* recorded (Zimmerman, 1958), a white form, Fig. 10, occurs at a frequency up to 4% (R. Silberglied in litt. via the Bishop Museum) but it does not closely resemble the mutant described here. The circumstances which favor this high survival rate are certainly worth investigation.

TABLE 3. Totals of presumed backcrosses.

Parents		Offspring			
		Normal		Mutant	
		♂♂	♀♀	♂♂	♀♀
15469	mutant ♀ × normal ♂	4	5	4	5
15473	mutant ♀ × normal ♂	2	1	3	1
15598	mutant ♀ × normal ♂	4	4	2	3
		10	10	9	9

## ACKNOWLEDGMENTS

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